AMENDMENTS TO THE CLAIMS

The following claims replace all prior versions and listings of claims in the application:

1. (Currently Amended) A method for defining tone signals in a voice activity detection (VAD) device, comprising:

defining a threshold ~~for zero amplitude change by determining, for a signal with a zero value amplitude at a zero crossing point, a tangent value of the signal, and by defining the zero value amplitude as a non-zero value depending upon the tangent of said signal at the zero crossing point~~ to compare with a difference between a sequence of duration periods in an incoming signal to a duration period of a single frame of the signal;

~~calculating a~~ determining zero crossing ~~rate~~ points of ~~a signal~~ the signal;

extracting a set of parameters from ~~a plurality~~ the sequence of duration periods that are between the zero crossing points of said signal;

calculating a ~~maximum~~ difference between a summed mean of said ~~plurality~~ sequence of duration periods and a duration period in a single frame of said signal;

comparing said ~~maximum~~ difference with said threshold; and

declaring ~~a sample~~ the single frame of the signal as containing a tone when the ~~maximum~~ difference is not greater than the threshold.

2.   (cancelled)

3.   (Currently Amended)   The method of claim 1, wherein said defining comprises

defining ~~said zero value amplitude according to whether said tangent is positive or~~

~~negative~~ the threshold as one if the signal has no zero amplitude change, and

defining the threshold as two if the signal has a zero amplitude change.

4.   (Currently Amended)   A method for defining tone signals in a voice activity

detection (VAD) device, comprising:

defining a threshold ~~for zero amplitude change of a~~ to compare with a difference

between a sequence of duration periods in an incoming signal to a duration period of a

single frame of the signal [[;]] ͵

wherein where a portion of said signal used for said sequence and said single

frame does not contain a zero crossing point, defining a range of said signal that

contains a zero crossing point;

extracting a set of parameters from ~~a plurality~~ the sequence of duration periods of

said range of said signal;

calculating a ~~maximum~~ difference between a summed mean said ~~plurality~~

sequence of duration periods in said range; and

comparing said ~~maximum~~ difference of said range with said threshold; and

declaring ~~a sample~~ the single frame of the signal as containing a tone when the

~~maximum~~ difference is not greater than the threshold.

5.   (Currently Amended)   The method of claim 1, wherein the ~~maximum~~ difference

is calculated between a sum of ~~all~~ said durations and a single <u>period between zero

crossing points as </u>said duration <u>of the single frame</u>.

6.   (Currently Amended)   The method of claim [[1]] <u>4</u>, wherein the ~~maximum~~

difference is calculated using a mean difference between a sum of all said durations ~~and~~

~~a single duration~~ <u>within said defined range</u>.

7.   (Previously Presented)   The method of claim 1, wherein the method defines

tone signals according to an International Telecommunications Union (ITU)

recommendation G.729 Annex B VAD device.

8.   (Currently Amended)   The method of claim 1, wherein said calculating said

~~maximum~~ difference comprises ~~calculating a product~~ <u>comparing durations between

adjacent negative products in said incoming signal.</u> ~~between the sample and the~~

~~sample's adjacent sample in a group of signal samples~~.

9.   (Currently Amended)   A device for defining tone signals for voice activity

detection (VAD), comprising:

        a processor that is programmed to:

~~define a threshold for zero amplitude change by determining~~ determine, for a signal with a zero value amplitude at a zero crossing point, a tangent value of the signal[[,]] ⫶ and ~~by~~

~~defining~~ define the zero value amplitude as a non-zero value depending upon the tangent of said signal at the zero crossing point; and

calculate a zero crossing rate of ~~a signal;~~ the signal

~~extract a set of parameters from a plurality of duration periods of said signal;~~

~~calculate a maximum difference between said plurality of duration periods; and~~

~~compare said maximum difference with said threshold and;~~

~~declare a sample of the signal as containing one of a tone, modulated tone, and saturated tone when the maximum difference is not greater than the threshold.~~

10.   (Cancelled)

11.   (Currently Amended)   The device of claim 10, wherein said processor ~~defining comprises defining~~ defines said zero value amplitude according to whether said tangent is positive or negative.

12.   (cancelled)

13.   (Currently Amended   )   The device of claim 9, wherein ~~the maximum difference~~

is calculated by the processor between a sum of all said durations and a single said duration incorporates the zero crossing rate into a decision of whether the incoming signal contains a tone.

14.   (Cancelled)

15.   (Previously Presented)   The device of claim 9, wherein the device defines tone signals according to an International Telecommunications Union (ITU) recommendation G.729 Annex B VAD recommendation.

16.   (cancelled)

17.   (Currently Amended)   The method of claim 1, wherein the further comprising: calculating the a zero crossing rate that comprises:

        analyzing the sample to determine if an amplitude of a signal sample is zero at a zero crossing point;

        when the amplitude is zero at the zero crossing point, determining a tangent of a signal wave of the signal sample at the zero crossing point;

        changing the signal amplitude from zero to negative one if the tangent is negative; and

        changing the signal amplitude from zero to positive one if the tangent is

positive.

18   (Previously amended)   The method of claim 1, wherein the declaring the

sample comprises declaring the sample as containing a voice tone received in the VAD

device.

19.   (Previously Amended) The method of claim 4, wherein the defining the

threshold for zero amplitude change comprises determining, for a signal sample with a

zero value amplitude at the zero crossing point, a tangent value of the sample, and

defining the zero value amplitude as a non-zero value depending upon the tangent of

said sample point, and

        calculating a zero crossing rate of the signal using the tangent value of the

sample.

20.   (Currently Amended)   The ~~device~~ method of claim [[9]] 4, ~~wherein the~~

~~processor is further programmed to define a threshold for~~ further comprising:

        calculating a zero crossing rate wherein the signal has a zero amplitude change

at a zero crossing by:

        analyzing the sample to determine if an amplitude of a signal sample is zero at a

zero crossing point;

        when the amplitude is zero at the zero crossing point, determining a tangent of a

signal wave of the signal sample at the zero crossing point;

changing the signal amplitude from zero to negative one if the tangent is negative;

and

changing the signal amplitude from zero to positive one if the tangent is positive.